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drawn for 50-millimeter intervals, except that in districts of less than 550 millimeters of rainfall no isohyets are drawn. The scale of this map is 1 : 1,000,000. Topography is not indicated. The heaviest rainfall occurs in the western portion of the peninsula and is shown to be 750–800 millimeters (about 30 inches). Topography is, in these cases, an obvious control. In the southern part of Jutland three west-east rainfall zones may be distinguished. The first, on the west coast, has dominant general storm rains. The second, inland, receives its rainfall from barometric depressions as well as from summer thunderstorms, the latter predominating, while the former become less and less important toward the east. The third zone, on the east coast, has a further decrease of general storm rains and also a decrease of thunderstorm rains. It is an interesting fact that these changes in the type of rainfall occur over so limited an area. A decrease in rainfall towards the north is also shown. The smallest amounts are slightly less than 20 inches, i.e. roughly equivalent to the mean annual rainfall along the 100th meridian in the United States.

The twelve monthly maps are on a scale of 3 : 1,000,000, with isohyets for every 10 millimeters. August is the rainiest month for most of Denmark. October brings a secondary maximum. Continental and marine tendencies are thus both indicated. Autumn rains are characteristic of the west coast. The August maximum is found over the interior.

R. DeC. Ward

A Biography of De Saussure

D. W. Freshfield. **The Life of Horace Benedict de Saussure.** xii and 479 pp.; maps, ills., bibliogr., index. Edward Arnold, London. 1920. 9½ x 6½ inches.

It seems somewhat surprising that over a century and a quarter should elapse after the death of De Saussure before his life was made the subject of an adequate biography. The name of De Saussure is intimately associated with two of the mightiest of the many intellectual and spiritual movements that had their origins during the closing years of the eighteenth century. One of these was that awakening love of nature and of mountains to which the romanticists gave expression in literature and in art and which has placed mountaineering in the foremost place not only among athletic sports but among recreations of the human spirit. The other was a movement in the realm of science away from the excessive theorizing and deductive reasoning that characterized eighteenth-century thought. It was a movement leading towards the work of men like Humboldt and Darwin, who founded their theories upon close observation of a multitude of facts. Humboldt was inspired to imitate the method of De Saussure whom he regarded as his master, and it "was the perusal of Humboldt's works which awoke in the young Charles Darwin the passion for travel and discovery" (p. 440).

At last justice has been done to the memory of De Saussure in the ample biography before us. By availing himself of the results of recent researches made by Mr. Henry F. Montagnier in the libraries and private archives of Geneva, Mr. Freshfield found at his disposal a wealth of hitherto unpublished material on De Saussure's career. The information obtained from these sources was supplemented by wide studies of the Genevan professor's scientific, literary, and political contemporaries, and the whole account is delightfully presented in a dignified and restrained, but vivid, English style. Indeed the book does far more than tell us of De Saussure. It introduces us to the leading figures of a critical period in the development of science and of mountaineering and gives us an intimate view of normal life in a refined intellectual and social circle of French-speaking Europe on the threshold of the French Revolution. By no means the least important part of Mr. Freshfield's biography are the pages devoted to Genevan politics during the last years of independence, the menace of the ideas that led to the great revolution in France, the final absorption of Geneva by France, and De Saussure's connection with these events.

De Saussure's fame, however, rests primarily upon his Alpine expeditions and upon researches in geology and meteorology. An illuminating chapter on the beginnings of interest in mountains and mountaineering enables us to estimate the importance of De Saussure's work in this respect. The claim has often been made that to Rousseau should be attributed the credit of arousing the mountaineering enthusiasm and appreciation of mountain landscapes that have become so characteristic of modern life. This claim Mr. Freshfield believes to be essentially false: Rousseau, who never even climbed a mountain and least of all ventured into regions of glacier and *névé*, was a lover and interpreter of the more placid scenery of lowland and foothill. If to any one individual belongs the greater share of credit for having revealed the world of crags and ice it is to De Saussure. By offering a prize to the first man who should scale Mont Blanc, De Saussure urged the peasants of Chamonix to hazardous ventures ultimately crowned by success when Jacques Balmat reached the summit in August, 1786. After many attempts and delays, De Saussure himself achieved the ascent with a large party of guides the next year. This exploit created a prodigious sensation throughout Europe and is the feat for which De Saussure even now is most widely remembered, though more difficult and deserving of even higher praise was his long sojourn on the Col de Géant (1788) where he remained at an altitude of nearly 11,000 feet for over a fortnight carrying out meteorological observations.

Though De Saussure undeniably did much to open the way to future Alpinists, the main motives which induced him to undertake journeys in the Alps were neither a love of landscape nor a love of adventure. Before all else a scientist and geologist (he was the first to use the term *geology* in its modern sense), De Saussure was induced to explore mountains because he felt that they reveal far more advantageously than lowlands the structure of the earth and atmosphere and the "great processes of world-building" (p. 433).

The concrete results of his observations are too numerous to indicate here: indeed they were so numerous that Mr. Freshfield himself could but refer to them in a summary manner. In the field of geology his investigations led him among the first to an understanding of the succession of formations outward from the central core of a mountain range; in that of meteorology he invented many ingenious instruments and carried out extensive instrumental observations and experiments; his study of glaciers unfortunately yielded the least valuable results of his many researches.

The lasting scientific value of De Saussure's labors lay less in the originality of his theories than in the multitude of facts which he observed and the accuracy of his observations. He was criticized by contemporaries (possibly with some slight justification) for his hesitancy to theorize. It should be remembered, however, that death cut him short at the age of fifty-four when his life work was still unfinished and that at the time of his death he had in mind the composition of a great "Theory of the Earth" based upon his earlier work. It is to his lasting credit that he stood out valiantly against the often fantastically theoretical thought of his time.